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ABSTRACT

Reported are a special project institute and followup workshop designed to influence and facilitate the dissemination, adoption, and implementation of the Special Education Programs in the Life and Environmental Sciences developed by the Biological Sciences Curriculum Study for 11- to 16-year-old educable mentally handicapped (EMH) students. Outlined is the program of the 5-week institute held in the summer of 1975, at which Me Now (a 2-year life sciences program on functions of the human body for 11- to 13-year-old EMH students) and Me and My Environment (a 3-year environmental sciences program for 13- to 16-year-old EMH students) were presented to and evaluated by 33 participant educators. Results of evaluations of the curriculum programs and of the institute are presented in tabular form. Also described is a followup workshop held in the summer of 1976 and attended by 44 participants, 19 of whom were returning members of the 1975 institute. Project evaluations from this workshop are included with personal comments. Names and addresses of the project participants are listed, and the document is illustrated with photographs. (IM)

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july 1976
prepared by
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DISSEMINATION AND INSTRUCTIONAL IMPLEMENTATION FOR *ME NOW AND ME AND MY ENVIRONMENT*

the BSCS life and environmental science curricula for the educable mentally handicapped

1976

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Report on the BSCS/EMH Instructional Improvement Implementation Grant for ME NOW and ME AND MY ENVIRONMENT

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Me and My Environment

THE BSCS/EMH SCIENCE CURRICULA

The teaching of science to 1,500,000 educable mentally handicapped (EMH) children of school age in the United States has been largely neglected. At best, the teaching of science has been incidental to the teaching of other subject matter in the special education curriculum. At worst, no science program has been made available. Perhaps a reason for this neglect is that science has been considered too difficult for the retarded. An unsupported supposition has been that science requires skills and abilities considered beyond the capabilities of this segment of the school population. Perhaps also, teachers of the retarded have been given too little preparation in selecting the science content that has applicability for mentally handicapped students as they try to cope with and solve their everyday problems. Of equal significance, and perhaps most important from the practical point of view of teachers, has been the lack of suitable materials for instruction—materials with scope, sequence, and objectives that are specifically developed for that population.

Thus, unusual effort must be expended in implementing these programs because of: (1) a lack of subject-matter background in the population of teachers; (2) an absence of precursor programs that teachers can draw upon for experience; (3) a general lack of experience in attempting to teach such a curriculum to the target population on a wide scale; (4) special learning problems of the target population. It was to these four points that the original implementation proposal was addressed.

Compared to the bulk of the school-age population, EMH youngsters have had a disproportionately small effort expended on them in developing stimulating and challenging curriculum material aimed specifically at their needs. Within the past eight years, the Bureau of Education for the Handicapped of the United States Office of Education has placed major funding emphasis on the development of seven curricula in the fields of reading, social learning, physical education, mathematics, and science for the EMH population.

Two of the programs that have been published were developed in science by the Biological Sciences Curriculum Study. The first, ME NOW, is a two-year life sciences program to help 11- to 13-year-olds develop an understanding of the needs and functions of their own bodies. The four units of the two-year program of instructional activities include: (1) Digestion and Circulation; (2) Respiration and Body Waste; (3) Movement, Support, and Sensory Perception; and (4) Growth and Development. Units 1, 2, and 3 form the foundation for an understanding of growth and development as it is presented in Unit 4.

This two-year curriculum is student-oriented and activity-centered; it includes a minimal amount of low-level reading material for the student. A comprehensive teacher's guide for each unit provides detailed instructions for the teacher with little or no science background. Essential teaching elements for the four content units are provided in kits. Among these elements are evaluation instruments, chemicals, supplies, and a human torso with functioning components representing the nervous, respiratory, digestive, urinary, and circulatory systems. A variety of audiovisual aids are also provided in the kit, including slides, filmstrips, film loops, posters, pictures, and worksheets.

Dick Johnson discusses the sensory system of "Dudley" with Helen Hunter, Norma Boekel, and Marie Igoe.

Based on the inquiry approach, the units aid in developing the skills of observing, describing, identifying, comparing, associating, inferring, applying, and predicting. The learn-by-doing sequential activities include carefully planned cumulative redundancy. The curriculum provides a constant stimulus to the curiosities of EMH children.

The second curriculum developed by the BSCS—ME AND MY ENVIRONMENT—is a three-year environmental sciences program for 13- to 16-year-old EMH junior high children. It provides an opportunity for these children to explore their environments and the interrelationships within it. Inquiry strategies are continued in the sequential curriculum, which consists of the following five units: (1) Exploring My Environment [one year], (2) Me as an Environment [one-half year], (3) Energy Relationships in My Environment [one-half year], (4) Transfer and Cycling of Materials in My Environment [one-half year], and (5) The Water and Air in My Environment [one-half year]. This, also, is a student-oriented, activity-centered, sequential program with planned redundancy and a minimal amount of low-level reading material for the student.

To meet the national goal of making self-sufficient, participating citizens out of the 6 million educable mentally handicapped persons in this country, it is not enough to develop adequate materials; that is only one part. The second and in many ways the more difficult task is to prepare teachers to utilize these materials in their classrooms.

MAJOR OBJECTIVES OF THE PROJECT

1. *To establish fifteen pilot implementation teams in various geographic regions across the United States to influence and facilitate the dissemination, adoption, and implementation of ME NOW and ME AND MY ENVIRONMENT, the Special Education Programs in the Life and Environmental Sciences developed by the Biological Sciences Curriculum Study.*

An important facet in implementation is dissemination. It was, therefore, the intent of the implementation project to involve fifteen geographically separate school districts throughout the country in dissemination by having prospective participants apply as a group of three from each school district; the group was to include one special education administrator or supervisor who had authority to coordinate the implementation of the two programs within the district, one elementary (intermediate) teacher, and one junior high school teacher. These three people, in conjunction with BSCS personnel, would invite local university or college special educators or science educators and an interested lay person to work with them during the year. The latter two persons would not attend the summer institute. Since it was the intent that the three people would serve as demonstration implementors within their own districts, no more than one person from each category in any one district was to be selected from those applying. The selection of individuals was made without regard to race, creed, color, national origin, or sex.

The inclusion of an administrator or supervisor on each team was considered necessary to facilitate the adoption of the two curricula by that person's school system. In larger systems the niche of administrator or supervisor is often filled by supervising classroom teachers or assistant directors of education; in smaller systems, the director of special education serves in this capacity. The elementary teacher was responsible for the actual instruction of the ME NOW demonstration class, and the junior high school teacher was responsible for the instruction of ME AND MY ENVIRONMENT. These people could then speak from direct classroom experience when presenting their facet of the program to others.

The university or college member of the team was to help introduce the curriculum to the community. That team member also functioned as a liaison between the local Council for Exceptional Children (CEC) chapter and the team. The lay person or parent was to represent the National Association for Retarded Citizens or an organization of parents and act as the "consumer" liaison between the school, community organizations, and school board. A rationale for including this last person developed during the field-testing of the programs, when it was found that some of the most active support, both morally and in terms of acquiring materials not provided for in the budget, came from organizations of parents, as well as from local service organizations.

The mechanics and details of the implementation plan are presented under "Project Description." Likewise, the evaluation plan and the criteria by which the effectiveness of this model will be judged are discussed in the section entitled "Project Evaluation."

2. *To provide team members with in-depth experiences with ME NOW and ME AND MY ENVIRONMENT.*

The primary goal of the institute was to insure adequate teacher preparation. Field-test data indicated that a definite attitudinal change was usually necessary in both groups of teachers. They must accept the ideas that:

1. They themselves need not be intimidated by science.
2. The components of these curricula include more than just facts and concepts; they include development of skills and processes structured into an objective sequence, as well as a set of related expectations for students accompanied by strategies of teaching and learning in the cognitive and affective domains. All these components overlap and form another dimension—the organization of learners and materials, which affects the teaching strategies, the climate of the class, and the development of certain concepts.
3. EMH students can and will learn the subject-matter content of both programs.
4. Both programs hold high relevancy for EMH students in solving their persistent life problems.

3. *To provide support services to the regional implementation teams.*

The coordination of support services to the regional implementation teams was the primary responsibility of two BSCS personnel: a consultant in the BSCS Science for the Educable Mentally Handicapped Project, Dr. Bernadette Menhusen, and a secretary. Support services included providing informational material and media to be used during presentations to groups of interested educators, community organizations, or training aspects. On-site visitations by Dr. Menhusen provided assistance with implementation problems, informational presentations, or public relations.

PROJECT DESCRIPTION

The BSCS/EMH programs are the only science curricula specifically designed for the educable mentally handicapped. The emphasis in teaching content and skills is on the active participation of students, using familiar and concrete objects. Learning is expedited by the development of process skills. The teaching strategies are such that content and processes are encountered repeatedly and with regularity; in similar contexts, a wide variety of media provides for a planned intellectual redundancy. Because of the unique learning problems of the EMH population, this approach insures that these students will be presented with optional channels for learning so that they can choose the ones best suited to their own information-processing skills. It was with this same focus that the adult participants progressed through the programs, from the experiential beginning to the synthesized learning of the more complex final activities.

Plans for providing these experiences for the teams of inservice teachers and administrators included a five-week summer institute in 1975, support services for the participants during the 1975-1976 academic year, and a three-day follow-up workshop in July of 1976.

SUMMER INSTITUTE

A summer institute for the participants was planned for July 14 to August 15, 1975. Facilities at Fairview High School in Boulder were rented by the BSCS for the five-week period. This was the beginning of the project to provide an opportunity for an in-depth study of the programs and an opportunity for participants to learn of the philosophies and teaching strategies.

Participant Data

Approximately 1,750 informational brochures were distributed at meetings and mailed to potentially interested persons when the project was first announced. Thirty-six persons completed and submitted the application forms for the forty-five positions which were available in the institute. All were notified of their acceptance; three of the applicants were unable to attend, however, because of personal or family problems. Thirty-three participants attended the institute and completed the classwork. Figure 1 is a photograph of the entire group taken during the institute. The names and addresses of all participants are listed on page 20.

There were eight teams of teachers and administrators in attendance. These teams were from Baltimore, Maryland; Norfolk, Virginia; Oxon Hill, Maryland; Pueblo, Colorado; Atlanta, Georgia; Haleiwa, Hawaii; Fitchburg, Massachusetts; and Omaha, Nebraska. Because there were

Figure 1.
Participants in the Summer Program for Implementation of ME NOW and ME AND MY ENVIRONMENT
LEFT TO RIGHT:
BACK ROW: Charlotte Welker, Edward Meyen, Bernadette Menhusen, Sel Elizondo, David Floyd, Nick Nichols, Wilda Briggs, Arthur George, Donald Clanton, Patricia Koeneman, Bill Donovan, Jr., Cynthia Edwards, Pamela Johnson.
MIDDLE ROW: Bob Marino, Eugene Swain, Candace Light, Marie Igual, Rebecca Brown, Debora Kennedy, Kay Campbell, Elsie Reid, Molly Byock, Yvette Castillo, Maureen Mulvaney, Ann Smith, Joyce Anderson, Joan Johnson, Ernestine Swain, Norma Boekel, Helen Hunter.
FIRST ROW: Roy Baer, Ed Drexler, Jan Peterson, Patricia Saybolt, Carole Hastings, Janet Chu, Barney Parker, Dick Johnson, David Lunn, Roy Gromme.
NOT SHOWN: Jim Turner.

no other team applications, thirteen individual classroom teachers were invited to attend. They taught at the elementary, junior high, and senior high school levels in Alaska, Alabama, Florida, Alberta, Massachusetts, Tennessee, Pennsylvania, New Jersey, and Wisconsin. The participants formed a diverse group, geographically dispersed throughout the states, as shown on the map in Figure 2.

- original teams attending 1975 NSF Summer Institute
- original singles attending 1975 NSF Summer Institute
- teams attending both 1975 NSF Summer Institute and 1976 Follow-up Workshop
- singles attending 1975 NSF Summer Institute and bringing a team to the 1976 Follow-up Workshop

Figure 2.
Geographic Locations of 1975 NSF Summer Institute Participants and Returning Participants in the 1976 Follow-up Workshop.

Of the thirty-three participants, twenty-three held undergraduate or graduate degrees in the field of special education; the other ten held degrees in a field of science. Twelve were elementary classroom teachers, five taught at the junior-high level, nine taught at the senior-high level, and one at the university level in teacher training classes in the department of special education. Six of the group were administrators. Seven of the participants had attended previous institutes of four or more weeks duration sponsored by the National Science Foundation or another federal agency.

Teaching experience of the participants ranged from 0.5 year to 19.0 years. The mean was 7.9 years. The median was 6 years; there was a bimodal pattern with four in each category of 1 year and 4 years.

Participants in the ME NOW program visit a florist shop as part of an activity related to use of the senses.

Thirty-two of the thirty-three participants enrolled at the University of Colorado in courses EPOB 635, Biology for Teachers of the Mentally Handicapped, and EPOB 665, Laboratory Techniques in Biology for Teachers of the Mentally Handicapped, for three hours of college credit for each class—a total of six hours of credit. In addition to the thirty-three participants, two of the EMH office staff and one of the BSCS/EMH graduate student interns enrolled in the class; an undergraduate major in special education at the University of Northern Colorado also attended the class sessions.

Program

Large group sessions, led by Roy Gromme and Bernadette Menhusen, were planned for the participants. These were designed to improve their basic process and problem-solving skills and teaching strategies, as well as to develop a philosophy of the program. Participants were given a choice of attending either the ME NOW or ME AND MY ENVIRONMENT sessions led by Norma Boekel* and Candace Light** respectively for the small-group meetings, with approximately half the participants selecting each group. During these curriculum sessions, the specific groups observed demonstration teaching by the instructors and participated in group discussions and peer teaching. Two complete kits of materials for both programs were supplied to each of the two groups, and the participants actually prepared materials, taught, or participated in almost all of the activities of the program. Approximately one-fourth of the class time was spent in developing teaching strategies, one-half in teaching or participating in the activities, and one-fourth in developing techniques in preparation of materials and classroom organization. Children from a local EMH junior high class were brought into the class for demonstration teaching of several activities. Some time was spent by each participant in preparing informational presentations of ME NOW or ME AND MY ENVIRONMENT, or both, for colleagues or laypersons

Several guest speakers were invited to participate in the institute sessions. Their presentations were interesting and worthwhile contributions to the program. The names of the speakers, their addresses, and the titles of their presentations follow:

INDIVIDUAL PRESENTATIONS

Dr. William Reid, Chairman, Department of Special Education, Florida State University: "The Who, What, Why, and How of the BSCS Science for the Handicapped."

Dr. Richard Tolman, BSCS Consultant: "Evaluation of the BSCS Science for the Handicapped Programs."

Dr. James Robinson, BSCS Consultant: "Cognitive Development of the Exceptional Student."

Dr. Edward Meyen, Chairman, Department of Special Education, Division of Education, The University of Kansas, Lawrence, Kansas: "Mainstreaming of EMH Children."

Mr. Patrick McKeon, President, Hubbard Scientific Company, Northbrook, Illinois: "Philosophy and Problems of the Publishers."

*Norma Boekel, University of Northern Colorado, Greeley, Colorado.
**Candace Light, Junior High School Teacher, Crested Butte Junior High School, Crested Butte, Colorado.

SYMPOSIUM PRESENTATIONS OF OTHER EMH PROGRAMS

Ms. Barbara McLean, Associate Director, Project MORE, George Peabody College for Teachers, Nashville, Tennessee.

Dr. Paul Vogel, Evaluation Coordinator, Project ICAN, Michigan State University, East Lansing, Michigan.

Ms. Angela Lepore, Educational Assistant, Project MATH, University of Connecticut, Storrs, Connecticut.

Dr. Herbert Goldstein, Project Director, The Social Learning Curriculum, Yeshiva University, New York, New York.

These guest speakers from the four other EMH programs gave informational presentations concerning those programs and their interfaces with ME NOW and ME AND MY ENVIRONMENT, as well as presentations on implementation and research. Discussions between the speakers and participants provided an opportunity for the exchange of ideas, solutions to some common problems, and increased knowledge of the entire thrust and rationale of curriculum development for the mentally handicapped.

Evaluation

PROCESS SKILLS

We assume that it is necessary for all teachers to have some content background, as well as a background in the process and problem-solving skills utilized in ME NOW and ME AND MY ENVIRONMENT in order to teach the programs successfully.

Instruction and pre- and postevaluation items were planned by the leaders, with examples of materials from the program or similar materials used to teach and assess the skills of participants in observing, identifying, associating, describing, comparing, translating, inferring, and applying, as well as the more complex skills of problem-solving.

To assess the backgrounds of the participants, a premeasure was administered on the second day of the institute. The same measure was administered on the last day of the institute. Raw scores and percentages correct were calculated on the items.

The averages of the 20-point pre- and postmeasure scores of the individual participants are shown in Table 1.

Table 1. Averages of pre- and postmeasure scores.

	Premeasure		Postmeasure	
	Scores	Percentages	Scores	Percentages
Mean	10.6	53%	16.2	81%
Median	10.6	53%	17.0	85%
Mode	12.0	60%	18.0	90%
Range	4-16	20-80%	14-18	70-90%

The results of the pre- and postmeasure are summarized graphically in Figure 3. Two of the most dramatic differences occurred in the process skills of associating (an increase of 66 percent) and inferring (an increase of 57 percent). In the more complex problem-solving skills, involving also the simpler process skills, there were marked increases in scores: 29 percent on interpretation of data, 47 percent in organizing data, and 58 percent in experimenting (i.e., actually in designing a controlled experiment).

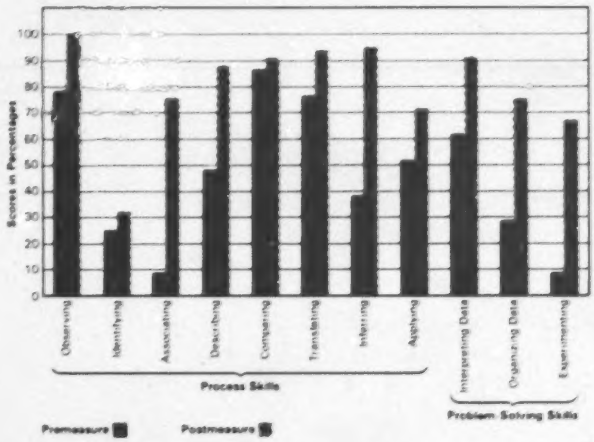


Figure 3.
Percentage of correct scores on pre- and postmeasures of process and problem-solving skills of participants.

The pre- and postmeasure scores were separated according to the positions of the participants as elementary teachers, junior and senior high teachers, and supervisory or administrative personnel. The summarization is shown in Figure 4. Each group made significant improvement on the total scores.

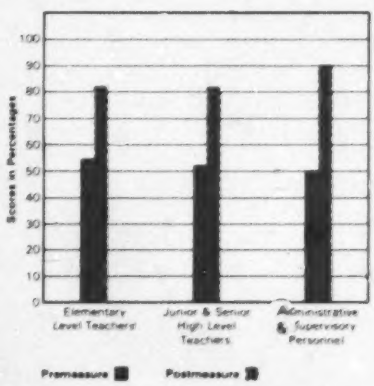


Figure 4.
Percentage of correct scores on pre- and postmeasures of process and problem-solving skills of participants as groups of elementary teachers, secondary teachers, and administrative and supervisory personnel.

SEMANTIC DIFFERENTIAL

To determine if changes of concepts or word associations occurred among the participants, a pre- and postsemantic differential inventory was administered during the first and last class sessions, using the following topics: SCIENCE, TEACHERS OF HANDICAPPED CHILDREN, CHILDREN WITH LEARNING DISABILITIES, and SCIENCE FOR CHILDREN WITH LEARNING DISABILITIES. Scales of pairs of adjectives of opposite polarities were selected for participant response. The participants were instructed to read the word at the top of the page and then to read the two adjectives on each line; then quickly to place a check in one of the ten spaces on the scale that they felt most closely expressed their feelings in relation to the topic (see Figures 5 to 9).

Some of the responses indicated quite a dramatic change in the attitudes of the participants. With the term SCIENCE, for example, there was a shift in attitude from 36 percent in the premeasure to 91 percent in the postmeasure toward the *happy* pole; a shift in choice of the term *easy* from 3 percent to 46 percent in the postmeasure, and a reduction from 14 percent in the premeasure to 7 percent in the choice of the term *hard*; and between the terms *weak* and *strong* there was a shift from 30 percent to 69 percent toward the term *strong* (see Figure 5).

SCIENCE*

	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	
1. happy	36	(91)	43	(6)	10	(3)	11	--	--	--	sad
2. easy	3	(46)	23	(29)	20	(14)	40	(4)	14	(7)	hard
3. strong	30	(69)	27	(16)	37	(9)	6	(6)	--	--	weak
4. sweet	18	(42)	21	(16)	46	(42)	15	--	--	--	sour
5. heavy	35	(27)	28	(10)	30	(53)	6	--	3	(10)	light
6. relaxed	33	(55)	23	(19)	17	(23)	17	(3)	10	--	tense
7. exciting	70	(87)	23	(13)	--	--	7	--	--	--	dull
8. clean	40	(39)	13	(23)	33	(32)	7	(3)	7	(3)	dirty
9. large	43	(52)	20	(12)	23	(36)	--	--	14	--	small
10. fast	25	(26)	50	(23)	13	(42)	6	(3)	6	(6)	slow
11. high	33	(50)	30	(16)	31	(31)	3	--	3	(3)	low
12. hot	17	(16)	20	(10)	56	(68)	7	(6)	--	--	cold
13. orderly	70	(81)	23	(13)	--	(3)	--	(3)	7	--	chaotic
14. good	77	(84)	13	(13)	4	(3)	3	--	3	--	bad
15. real	97	(90)	3	(7)	--	(3)	--	--	--	--	make-believe

Figure 5.
***Data were converted to percentages within each two-division interval on the ten-place scale. The first number in each space on the scale is a percentage of the premeasure score and the number in the parentheses is the percentage of the postmeasure score.**

Participants in the ME NOW group construct the arm model.

Interesting differences in responses occurred on the topic of TEACHERS OF HANDICAPPED CHILDREN in which approximately the same high percentage of participants considered these teachers to possess characteristics of being *happy, strong, sweet, relaxed, exciting, clean, innovative, joyous, patient, kind, competent,* and *liberal* on the pre- and postmeasure (see Figure 6).

TEACHERS OF HANDICAPPED CHILDREN*

	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	
1. happy	72	(87)	18	(19)	10	--	--	--	--	--	sad
2. strong	76	(67)	14	(12)	7	(12)	3	(3)	--	(6)	weak
3. sweet	59	(60)	17	(9)	24	(31)	--	--	--	--	sour
4. relaxed	52	(56)	17	(22)	21	(19)	7	(3)	3	--	tense
5. exciting	62	(67)	32	(28)	3	(5)	3	--	--	--	dull
6. clean	55	(67)	18	(12)	19	(18)	8	--	--	(3)	dirty
7. fast	10	(35)	14	(22)	46	(34)	8	(3)	22	(6)	slow
8. friendly	93	(82)	3.5	(12)	3.5	(6)	--	--	--	--	unfriendly
9. altruistic	62	(54)	--	(13)	31	(33)	--	--	7	--	eg...tical
10. leadership	68	(68)	14	(13)	14	(19)	4	--	--	--	followership
11. innovative	65	(66)	5	(16)	14	(12)	5	(3)	11	(3)	routine
12. joyous	66	(66)	17	(25)	7	(6)	10	(3)	--	--	depressed
13. patient	100	(82)	--	(9)	--	(6)	3	(3)	--	--	abrupt
14. kind	100	(94)	--	(3)	--	--	--	(3)	--	--	cruel
15. competent	86	(82)	7	(12)	7	(3)	--	(3)	--	--	incompetent
16. flexible	97	(85)	--	(12)	3	--	--	(3)	--	--	inflexible
17. liberal	45	(62)	14	(3)	20	(29)	14	(6)	7	--	autocratic
18. non-resiliency	4	--	--	(3)	17	(19)	11	(23)	68	(55)	resiliency

Figure 6.
***Data were converted to percentages within each two-division interval on the ten-place scale. The first number in each space on the scale is a percentage of the premeasure score and the number in the parentheses is the percentage of the postmeasure score.**

In the descriptive words for CHILDREN WITH LEARNING DISABILITIES, there was an increase in the percentages in the middle fifth of the scale between the pre- and postmeasures in the terms *happy-sad, relaxed-tense, flexible-inflexible, methodical-innovative, large-small, cold-hot, unimaginative-imaginative, high-low, uncreative-creative, soft-hard,* and *patient-impatient* (see Figure 7).

CHILDREN WITH LEARNING DISABILITIES*

	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	
1. happy	28	(23)	10	(19)	13	(42)	28	(16)	21	--	sad
2. tense	44	(22)	27	(29)	6	(20)	3	(19)	20	(10)	relaxed
3. weak	25	(3)	13	(20)	50	(42)	3	(23)	9	(7)	strong
4. clean	32	(31)	13	(25)	42	(38)	9	(6)	4	--	dirty
5. exciting	38	(36)	24	(32)	27	(26)	3	(3)	8	(3)	dull
6. flexible	28	(18)	13	(18)	28	(40)	28	(18)	3	(6)	inflexible
7. methodical	30	(7)	17	(23)	33	(57)	17	(10)	3	(3)	innovative
8. large	10	--	17	(7)	59	(70)	14	(14)	--	(6)	small
9. hot	7	--	17	(16)	74	(8)	--	(3)	--	--	cold
10. good	45	(48)	29	(26)	23	(23)	3	(3)	--	--	bad
11. real	64	(58)	9	(23)	18	(13)	10	(6)	--	--	make-believe
12. imaginative	40	(29)	29	(19)	20	(44)	11	(8)	--	--	unimaginative
13. high	13	(13)	23	(16)	47	(59)	7	(9)	10	(3)	low
14. creative	33	(36)	27	(26)	27	(32)	3	(6)	10	--	uncreative
15. soft	18	(6)	10	(13)	50	(57)	13	(23)	10	--	loud
16. sweet	23	(26)	23	(29)	48	(42)	3	(3)	3	--	sour
17. impatient	34	(16)	10	(19)	23	(29)	3	--	30	(7)	patient

Figure 7.
***Data were converted to percentages within each two-division interval on the ten-place scale. The first number in each space on the scale is a percentage of the premeasure score and the number in the parentheses is the percentage of the postmeasure score.**

Between the pre- and postmeasure percentage figures in the descriptive words for SCIENCE FOR CHILDREN WITH LEARNING DISABILITIES, there was a 13 percent to 3 percent redirection in terms of *hard*, a 37 percent to 43 percent increase in terms of *strong*, a 24 percent to 40 percent increase in terms of *high*, and a 37 percent to 53 percent increase located centrally between *fast* and *slow* (see Figure 8).

SCIENCE FOR CHILDREN WITH LEARNING DISABILITIES*

	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	
1 easy	33	(33)	17	(27)	20	(24)	17	(13)	13	(3)	hard
2 strong	37	(43)	20	(24)	33	(30)	--	(3)	10	--	weak
3 high	24	(40)	[illegible]	(20)	45	(33)	3	(7)	10	--	low
4 cold	10	--	3	(3)	80	(71)	17	(13)	10	(13)	hot
5 heavy	15	--	10	(27)	52	(53)	10	(17)	13	(3)	light
6 sweet	17	(13)	24	(32)	53	(52)	3	(3)	3	--	sour
7 fast	17	(9)	10	(19)	37	(53)	23	(16)	13	(3)	slow
8 possible	90	(84)	7	(10)	--	(1)	3	(3)	--	--	impossible
9 happy	68	(81)	19	(6)	13	(10)	--	--	--	(3)	sad
10 exciting	83	(81)	10	--	7	(16)	--	(3)	--	--	boring
11 light	43	(39)	13	(19)	41	(39)	--	(3)	3	--	dark
12 orderly	74	(61)	10	(19)	3	(17)	13	(3)	--	--	disorderly
13 innovative	45	(50)	3	(10)	24	(24)	10	(3)	18	(13)	methodical
14 creative	67	(71)	13	(16)	7	(13)	3	--	10	--	uncreative

Figure 8.
***Data were converted to percentages within each two-division interval on the ten-place scale. The first number in each space on the scale is a percentage of the premeasure score and the number in the parentheses is the percentage of the postmeasure score.**

On the rating scale for the term "Science," there was an interesting increase on the interval from 76 percent to 94 percent, and on the *easy-hard* comparison poles from 10 percent to 41 percent on the term *easy* and 24 percent to 6 percent on the term *hard*. On the topic of "Science in the Curriculum for Children with Learning Disabilities," there was an increase of 79 percent to 88 percent in terms of *relevant* and 79 percent to 84 percent in terms of *useful*. In the premeasures 3.5 percent rated the topic *not relevant*, and 4 percent rated it *not useful*; no one rated the topic in this manner in the postmeasure. Under the topic of "Concepts of Science for Handicapped Children," in the premeasure 10 percent rated these as too abstract to be understood, and no one rated them as such on the postmeasure; there was an increase of 52 percent to 65 percent of the highest interval toward *many are understandable* on the postmeasure.

"Science Teaching" was rated on a polarity scale of *easy-difficult*; on the premeasure 28 percent considered it *easy*, while 42 percent on the postmeasure rated it *easy*; it was considered difficult by 6 percent on the premeasure, and by none on the postmeasure (see Figure 9).

The spaceship is constructed and the flight simulated by the teachers, just as junior high youngsters do in ME AND MY ENVIRONMENT.

RATING SCALE*

Interesting					Uninteresting
76 (94)	21 (6)	-- --	3 --	-- --	
Science					
Easy					Hard
10 (41)	28 (22)	24 (18)	14 (13)	24 (6)	
Science					
Relevant					Not Relevant
86 (88)	10 (12)	-- --	4 --	-- --	
Science in the curriculum for "normal" children					
Relevant					Not Relevant
79 (88)	7 (9)	3.5 (3)	7 --	3.5 --	
Science in the curriculum for children with learning disabilities					
Useful					Not Useful
79 (88)	18 (12)	3 --	-- --	-- --	
Science in the curriculum for "normal" children					
Useful					Not Useful
79 (84)	7 (13)	7 (3)	3 --	4 --	
Science in the curriculum for children with learning disabilities					
Too abstract to be understood				Many are understandable	
10 --	10 (5)	7 (10)	21 (20)	52 (65)	
Concepts of science for handicapped children					
Easy					Difficult
28 (42)	25 (31)	17 (15)	24 (12)	6 --	
Science teaching					

Figure 9.
***Data were connected to percentages within each two-division interval on the ten-place scale. The first number in each space on the scale is a percentage of the premeasure score and the number in the parentheses is the percentage of the postmeasure score.**

These data indicate a change in the attitudes of the participants, particularly a more positive attitude toward science, the teaching of science, science in the curriculum for children with learning disabilities, and teachers of science.

The participants were an active and cooperative group who enjoyed and learned from the institute, as evidenced by the previous data and an Evaluation Questionnaire that they completed at the final meeting (see Figure 10).

The greatest percentage of participants (55 percent) indicated that they felt the institute was of the right length; that material was clearly presented, useful, interesting, and practical; that there was a suitable amount of material; that the institute achieved the needs of the participants; and that it was well planned. The participants had a better concept of the program after the institute and learned much that was new. They felt the large and small group sessions were not too structured nor too informal, were informative, illustrated the program, were interesting, and presented new ideas. Besides reacting to the items listed, participants felt the interaction among themselves was important. The program was new to most of the participants.

EVALUATION QUESTIONNAIRE FOR INSTITUTE

A. Please rate the institute according to the following scale.

1. THE INSTITUTE WAS:

too long	1(20)*	2(17)	3(55)	4(18)	5(-)	too short
clearly presented	1(26)	2(42)	3(16)	4(13)	5(3)	presentation ambiguous
useful	1(69)	2(28)	3(--)	4(3)	5(-)	ambiguous
interesting	1(63)	2(28)	3(6)	4(3)	5(-)	dull
too practical	1(--)	2(20)	3(70)	4(10)	5(-)	too theoretical
too much material	1(3)	2(--)	3(74)	4(17)	5(6)	not enough material
achieving your needs	1(38)	2(25)	3(19)	4(13)	5(5)	not achieving your needs
well planned	1(41)	2(38)	3(13)	4(3)	5(5)	not well planned

2. AS A RESULT OF THE INSTITUTE, I

	AGREE				DISAGREE
have a much better concept of the program	1(97)	2(3)	3(--)	4(--)	5(--)
am confused	1(--)	2(3)	3(6)	4(3)	5(88)
learned little that was new	1(3)	2(3)	3(16)	4(23)	5(55)

3. THE MATERIALS HANDED OUT WERE:

relevant and useful	1(56)	2(41)	3(-)	4(3)	5(-)	of little value

B. Please rate the group sessions according to the following scale.

THE LARGE GROUP SESSIONS:

were too structured	1(6)	2(23)	3(68)	4(--)	5(3)	were too informal
presented new ideas	1(36)	2(16)	3(23)	4(20)	5(5)	did not present new ideas
were informative	1(38)	2(24)	3(20)	4(9)	5(9)	were not informative
illustrated the program	1(36)	2(6)	3(28)	4(25)	5(5)	appeared unrelated to program
were interesting	1(28)	2(20)	3(20)	4(20)	5(12)	were dull

C. Please rate the group sessions according to the following scale.

THE SMALL GROUP SESSIONS:

were too structured	1(--)	2(6)	3(88)	4(6)	5(--)	were too informal
presented new ideas	1(69)	2(22)	3(9)	4(--)	5(--)	did not present new ideas
were informative	1(59)	2(35)	3(6)	4(--)	5(--)	were not informative
illustrated the program	1(75)	2(25)	3(--)	4(--)	5(--)	appeared unrelated to program
were interesting	1(81)	2(16)	3(3)	4(--)	5(--)	were dull

D. THE MOST IMPRESSIVE AND VALUABLE PART OF THE SESSIONS FOR ME WAS:

	AGREE					DISAGREE
the program itself	1(33)	2(--)	3(43)	4(18)	5(6)	6(--)
the staff	1(6)	2(44)	3(25)	4(19)	5(6)	6(--)
the equipment	1(--)	2(--)	3(6)	4(12)	5(25)	6(57)
the large group sessions	1(--)	2(6)	3(--)	4(6)	5(50)	6(38)
the small group sessions	1(12)	2(25)	3(19)	4(38)	5(6)	6(--)
the interaction among participants	1(50)	2(26)	3(6)	4(6)	5(6)	6(6)

E. THE PROGRAM PRESENTED IN THE INSTITUTE WAS:

entirely new	1(38)	2(31)	3(28)	4(3)	5(-)	nothing new

Figure 10.
***Numbers in parentheses represent percentages calculated from the original questionnaires (N = 32).**

Public Relations

During the second week of the institute, a copy of a news release about the institute was mailed to the hometown newspaper of each participant. A copy of a typical release as it appeared in the newspaper is shown in Figure 11. Following the institute, letters were sent to supervisory personnel of the participants telling of their successful completion of the institute.

Photographs and lists of participants were included in BSCS Newsletter 60, and news items were sent to several state publications as well as those of the Council for Exceptional Children and the National Association for Retarded Citizens.

Plans for Implementation

During the institute sessions, each of the participants prepared an outline and script for a 1½-hour informational or inservice presentation of the EMH programs and ordered $150 of program materials necessary for the presentation in their local areas. Each team of participants and individuals also received a series of informational slides and audio tapes on each of the two curricula, ME NOW and ME AND MY ENVIRONMENT, for use in their presentations.

Suggestions were made that the participants contact their local school administrators, special education or science consultants, local or state chapters of TTA, Council for Exceptional Children, National Association of Retarded Citizens, and other interested groups to request an opportunity to present the informational program they had prepared and to demonstrate or display the program material.

SUPPORT SERVICES FOR ACADEMIC YEAR 1975-1976

Support services to coordinate the implementation and dissemination of the two programs, as described in the original proposal, included:

1. Making on-site visits to the regional centers and demonstration schools.
2. Expediting the shipment and use of the commercially available curriculum kits from the publisher to the demonstration schools and centers.
3. Providing aid to the demonstration schools and centers in using existing teacher and student evaluation materials, as well as assisting in designing any new ones necessary.
4. Assisting in the provision of necessary demonstration materials as needed to persons participating in informational workshops and programs.
5. Assisting in the development, collection, evaluation, and reporting of feedback data.
6. Conducting a mid-year reorientation conference during January at the most centrally located center.
7. Presenting informational papers and workshops at various regional and national gatherings of various appropriate organizations.

Eugene Swain and Yvette Castillo blow smoke rings with the "smoking machine."

BSCS Holding Institute on New Programs

Three Boulder teachers or residents are among those taking part in a five-week institute here for implementation of two life and environmental sciences programs for educable mentally handicapped children.

David E. Floyd, Casey Junior High teacher, and Debora Kennedy, student at the University of Northern Colorado, are invited participants in the five-week program. Janet Chu, Fairview High School teacher, is a research and lab assistant.

The five-week institute is on the ME NOW and ME AND MY ENVIRONMENT programs developed by the Biological Sciences Curriculum Study of Boulder. ME NOW is a two-year program designed to develop a knowledge of the human body and its function. It has been developed for children of the age usually found in the intermediate grades. ME AND MY ENVIRONMENT is a three-year junior high program. It aims to develop a sense of identity as a person who can act in and have some degree of control over the environment.

The programs are two of the first science programs developed for handicapped children. The programs have been tested and, according to BSCS, rated successful in helping the mentally handicapped child develop interests, skills, and positive attitudes through experiences with scientific concepts.

Figure 11. Sample newspaper copy

These duties were the primary responsibility of Dr. Bernadette Menhusen and were executed as needs and requests were received. Dr. Menhusen visited with thirty of the thirty-three participants during the academic year. In the classrooms or schools of the participants she usually met and visited with several of the administrative personnel in the district, or faculty at local universities, taught demonstration classes, observed the teacher teaching and discussed teaching strategies after classes, met children of the class and discussed their science program with them, or assisted with informational or inservice presentations for other groups of teachers, lay persons, or both. Interest in the programs seemed high, and the personal contact with teachers and administrators in most schools seemed profitable. Several administrators were seriously considering adoption and had many pertinent questions concerning these programs that they wished to discuss.

The major change from the schedule included in the proposal concerned the mid-year reorientation conference in January. The time for this meeting was rescheduled from January to July of 1976 because of the lack of future funding. It seemed that the July date for the follow-up workshop would provide more impact during the 1976-1977 academic year than the January date. The original plan was for continuation of the project for a three-year period.

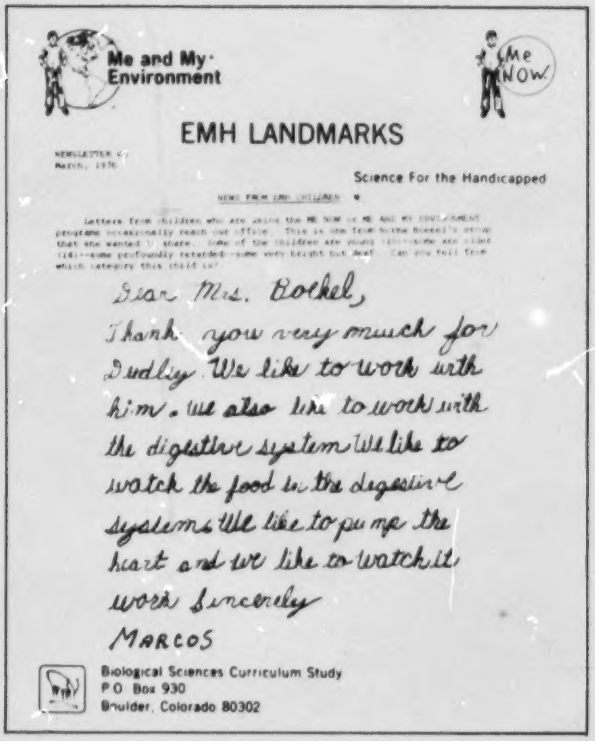
Both Roy Gromme and Bernadette Menhusen, as well as other EMH staff consultants and several of the institute participants, attended state, local, and national meetings of the Council for Exceptional Children in Chicago and the National Science Teacher's Association in Philadelphia during the Spring semester. Gromme and Menhusen presented papers on the two programs entitled "Meeting the Teacher's Responsibility to the Handicapped through Science," "Why Science for the Handicapped?" and "Training Teachers for Implementation and Dissemination." Two major articles were written and accepted for publication.[1,2]

All EMH staff consultants and some participants took active parts in the organizational meetings of the new groups, "Science for the Handicapped" at the NSTA meeting and "Division on Career Development" at the CEC meeting.

The Hubbard Scientific Company officers and sales personnel held receptions for the EMH program personnel who attended both meetings. All participants received invitations to both receptions and most who attended the meetings also attended the reception. Both receptions were well attended and many informal discussions concerning the programs were held.

EMH Landmarks

As a means of communication between participants and the EMH implementation director, Dr. Menhusen prepared a newsletter, *EMH Landmarks*, each month during the academic year (see Figure 12). Each issue contained special news or announcements about the programs, materials, or media; news or notes from participants, the BSCS/EMH office, the publishers, and the project director; and national news concerning education of EMH youngsters and meetings.


Me and My Environment

Me NOW

EMH LANDMARKS

Science For the Handicapped

Dear Mrs. Bethel,
Thank you very much for Dudley. We like to work with him. We also like to work with the digestive system. We like to watch the food in the digestive systems. We like to pump the heart and we like to watch it work Sincerely
MARCOS

Biological Sciences Curriculum Study
P.O. Box 930
Boulder, Colorado 80302

Figure 12.

The newsletter was highly successful and participants were interested in, enjoyed reading, and anticipated receiving each issue (see results of questionnaire, page 17).

FOLLOW-UP WORKSHOP

Because of the changes in funding policies, it seemed more feasible to hold the workshop during the summer of 1976 instead of during January, as stated in the proposal. It required time in the fall for participants to return, to order, and to receive and begin to use the classroom materials and to organize their teams and schedule presentations, so the January date would have been a bit premature to take full advantage of time and effort. The workshop scheduled in July provided renewed interest and impetus for the implementation and dissemination aspects and for continued influence of the project for the 1976-1977 academic year.

Participants indicated in a questionnaire that the week of 19 July would be the best time to schedule a follow-up workshop. Plans were made for the follow-up workshop to be held in Boulder, Colorado, at the Harvest House Hotel on 19, 20, and 21 July. Transportation and living expenses were provided for the teams who attended. The workshop sessions were held in meeting rooms at the Harvest House and luncheons were served to the group.

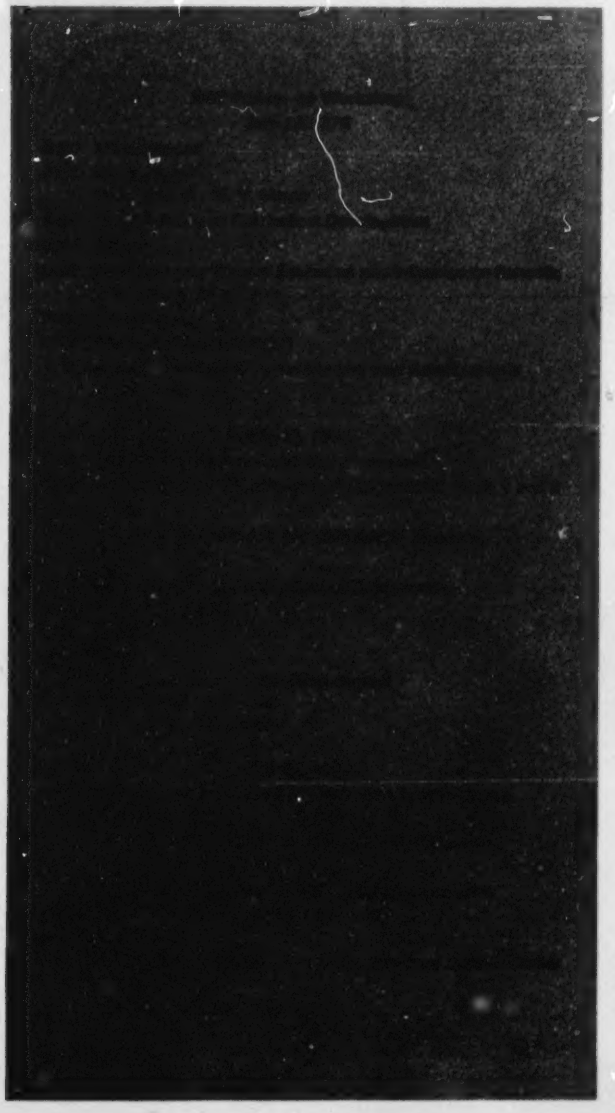
[1]Roy Gromme. 1975. BSCS Designs Curricula to Teach EMH Youth to Inquire. *School & University Review*. Volume 5, Number 3. Summer 1975. Pp. 3, 7-8, 16.

[2]Bernadette R.Menhusen and Roy O. Gromme. 1976. Science for Handicapped Children—Why? *Science and Children* Volume 13, Number 6. March. Pp. 35-37.

Participants

Invitations were extended to all original teams and to those individuals who had organized working teams composed of an elementary teacher for ME NOW, a junior high teacher for ME AND MY ENVIRONMENT, a school or departmental administrator, a college or university faculty member, and an interested lay person from the community of the team. Nine teams submitted applications to attend the workshop sessions; the teams were from Baltimore and Indian Head, Maryland; Norfolk, Virginia; Atlanta, Georgia; Council Bluffs, Iowa; Oshkosh, Wisconsin; Haleiwa, Hawaii; and Greeley and Pueblo, Colorado. A complete list of participants and addresses follow the text (see map in Figure 2). In attendance at the workshop meetings were 3 participants who had participated as individuals during the 1975 institute and who were in the geographic area, but the budget did not allow funds to pay the expenses for the return of individuals who had not formed teams in their areas.

Table 2. Schedule for the Follow-up Workshop.



Program

Objectives of the follow-up workshop were:

1. To introduce the new participants to the ME NOW and ME AND MY ENVIRONMENT programs and to review the programs for former participants.
2. To provide opportunities for all participants to engage in the hands-on activities of the program, and to explore or consider the suitability of the programs for EMH children in different types of schools and classroom situations.
3. To provide an opportunity for participants to learn of new BSCS/EMH materials published since August of 1975.
4. To provide an opportunity for sharing and gaining ideas for implementation and dissemination of the programs.
5. To develop a nucleus of key persons at all levels of the educational system interested in promoting curricular improvement for EMH children in the schools of their geographic regions.

As shown in Table 2, the following schedule for the three-day workshop was planned to achieve these objectives.

Evaluation

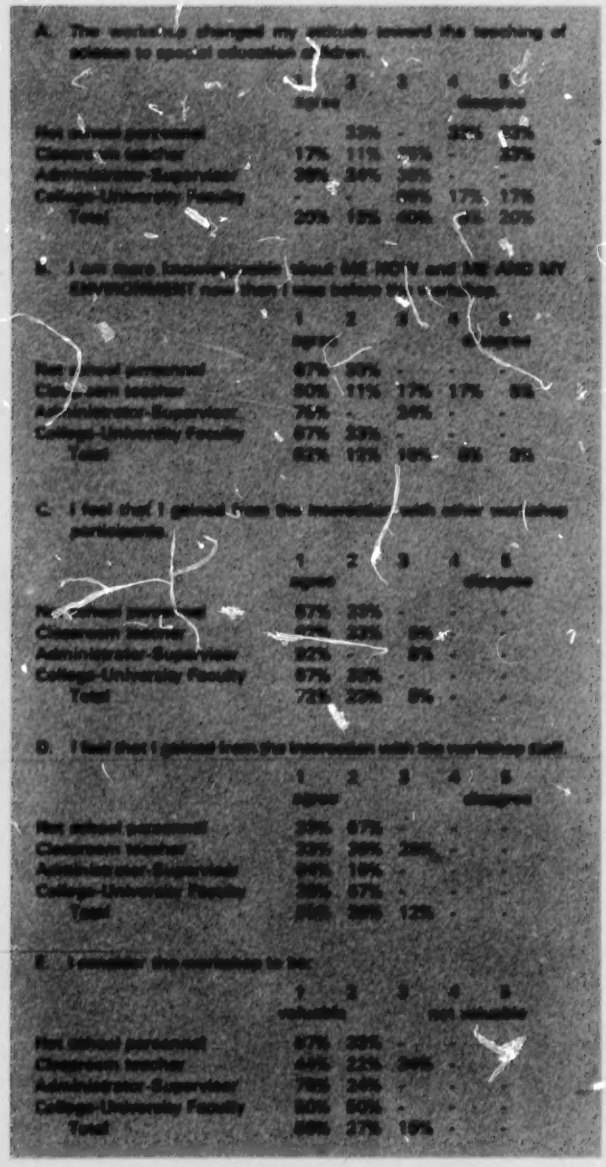
During the final day of the workshop, a questionnaire was distributed to the participants. Six university faculty members, seventeen school administrators or supervisors, eighteen classroom teachers, and three persons not officially connected with a school responded. Of these forty-four participants, nineteen were returning members of the 1975 institute and twenty-five were new team members. The responses to the questionnaire are summarized below.

From the differential value scale in Table 3, Item 2 (C), it is evident that most participants believed they had gained from the interaction with other workshop participants—72 percent of the total participants indicated they agreed to the highest degree (i.e., 1) on the five-point scale, 23 percent indicated they agreed to the second highest degree (i.e., 2) on the scale, only 5 percent indicated a median position of feelings on the scale, and none indicated feelings toward the negative pole.

In Item 2(D), 50 percent of the participants agreed that they had gained from the interaction with the workshop staff to the highest degree (i.e., 1) on the scale, 38 percent indicated they agreed to the second highest degree (i.e., 2), 12 percent indicated the median position of feelings on the scale, and none indicated feelings toward the negative pole.

Participants view evaluation filmstrips in ME NOW.

Table 3. Summary of Item 2 of the Workshop Final Evaluation Questionnaire.*



*All numbers are calculated percentages.

In Item 2(E), 58 percent indicated they considered the workshop to be valuable to the highest degree (i.e., 1), 27 percent indicated they considered it to be valuable to the second highest degree (i.e., 2), 15 percent rated it to be in the median category (i.e., 3), with no feelings indicated toward the negative pole.

Items 2(A) and 2(B), apparently, confused the participants; the results should therefore be disregarded since the participants felt they were inappropriate questions.

Responses to the following questions may be summarized as follows:

What do you feel was the strongest point of the workshop?

Participants construct the "muscle" for the arm model in a ME NOW activity.

Including more college and university faculty for training of preservice teachers.

Interaction of participants and teams—both new and former members.

Meeting leaders working in the fields of special education and science from various geographic areas.

Introductions to programs and new materials available.

The presentation concerning new legislation and the influence on children and schools.

"The strongest point of the workshop for me was the presentation of the ME NOW and ME AND MY ENVIRONMENT materials and activities. For the first time in ten years I was able to view *new* curriculum materials."—School Administrator or Supervisor.

What do you feel was the weakest point of the workshop?

Having members of last year's institute and new team members together for all presentations produced good results for new members but some redundancy for returning participants.

Too much time given to review of older programs and materials.

None.

Length of time—too short.

Needed more rap sessions.

Assumption of the basic knowledge of ME AND MY ENVIRONMENT.

"A workshop of this type with some participants who were new should have been scheduled for five days. Too much was included in the three-day session." — School Administrator or Supervisor.

My tentative plans for implementation and/or dissemination of the programs for 1976-1977 include:

Continue to give informational presentations at the local level to meetings of educators and interested civic groups. Some teams planned to schedule presentations at state, national, or international meetings of the Council for Exceptional Children, National Science Teacher's Association, National Association of Retarded Citizens, and other organizations of this type.

Provide training (1) for preservice and inservice teachers in regular classes and special workshops; (2) for interested civic groups; and (3) other college and university faculty members.

Continue to teach the program within individual classrooms and invite other interested teachers or administrators to observe the program in use as we expand the programs to additional classrooms and assist in providing inservice training. The team from Hawaii will provide inservice workshops on the outer islands and assist in implementation in forty-two classrooms. The team from Norfolk will assist in implementing the programs in all of the intermediate and junior high schools in the city.

Discuss plans for meetings with the local Hubbard representative and try to set up plans for meetings in the area.

Work with Special Education Instructional Materials Centers and Instructional Materials teachers.

Continue monitoring programs in the laboratory school with classes for the deaf and MR children.

"(1) Checking to see how much of this material is available in my district, (2) Using what is applicable with my own child, (3) Talking to other parents and educators about the program—and with educators and librarians about the need for similar material for preschoolers."—Person not officially connected with a school.

How do you feel the BSCS staff can best continue to help you in your implementation and dissemination efforts?

Personal visitations, calls or letters by BSCS/EMH staff with continued moral support.

EMH Landmarks or similar type of newsletter containing information of new materials, techniques, funding sources, news of other team members, and information on the development and publication of other EMH programs.

Additional meetings of this type to keep the group together.

Provide some materials for Units 4 and 5 of ME AND MY ENVIRONMENT for use in presentations.

Good representatives from the Hubbard Scientific Company are very helpful and should be encouraged to contact team members.

"I would like to see a BSCS program for the primary EMH students; this area could provide a good introduction to scientific procedures and methods."
— Classroom Teacher

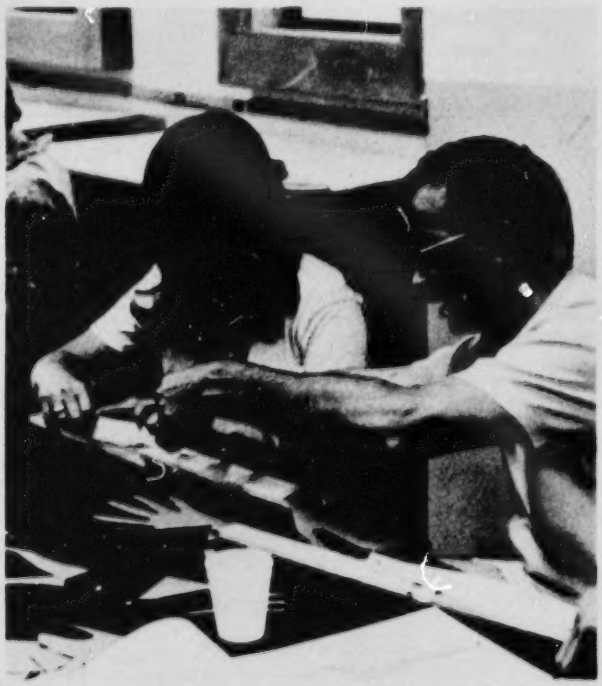
The evaluation questionnaire did not provide direct evidence, but informal observations of the staff indicated a very marked change in the overall attitude of the participants from the attitudes observed in the institute participants of last year. There was a shift from interest in the classrooms of individual participants (because most now have the programs well underway in their own classrooms or schools) to interest in city or district-wide implementation.

There are widening interests, ranging from interest in just the EMH science programs to an interest in other special programs for EMH children.

There are more roles being assumed by participants besides those of direct dissemination or implementation of the programs. One participant gave copies to his school administrators of the announcement in the *EMH Landmarks* of the 1976 BSCS Leadership Conference to provide an introduction to several programs for special education children. As a result, three persons applied and were invited to participate in the conference. This undoubtedly will enhance the special education program in that district greatly.

The procedure of forming teams involved bringing together new people of diversified interests, and this contributed added dimensions to the original teams and to the entire workshop group.

In review, the entire project seems to have been highly successful and a nucleus of well-trained, interested, and ambitious teams and individuals are working to disseminate and implement ME NOW and ME AND MY ENVIRONMENT across the nation.



Molly Byock and Roy Baer complete the arm model and add the hand.

PROJECT EVALUATION

In this project, as in similar implementation and dissemination projects, evaluation of the impact is extremely difficult to assess. An attempt was made, however, and a questionnaire was mailed to all institute participants. The following information was requested:

1. The number of presentations made by teams or individual participants, and the number of persons in attendance.
2. The number of classrooms, teachers, and children reached by the presentations, and the number of ME NOW and ME AND MY ENVIRONMENT materials adopted.
3. The impact in the district with respect to changes in the time spent on science in classrooms.
4. The feelings of participants concerning the inservice presentations.
5. The value, in retrospect, of selected aspects of the institute and support services.

The questionnaire was sent to each of the thirty-three participants in April. Thirty (91 percent) completed and returned the forms. One administrator and two classroom teachers did not respond.

In summary, the thirty participants gave a total of fifty-eight presentations to 1,800 persons from September to May.

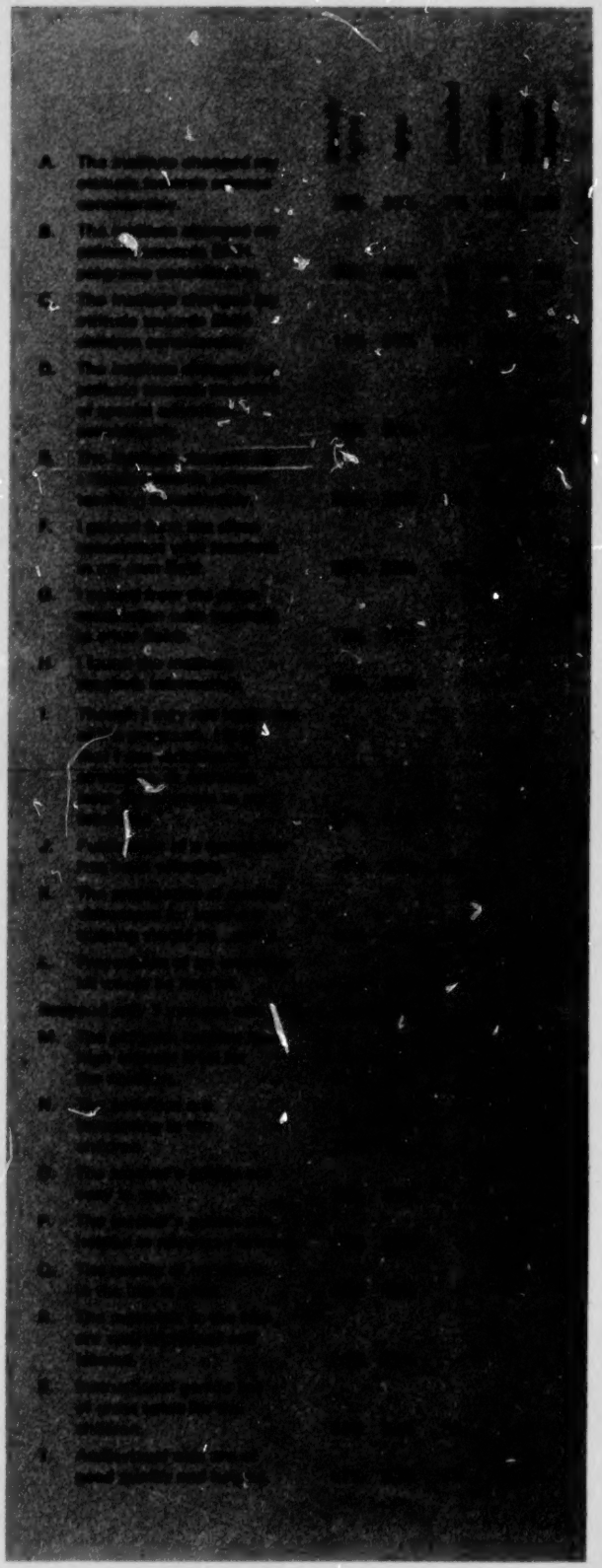
As a result of the presentations, it is estimated that eighty-seven classrooms in thirty-seven schools, or forty-seven teachers and 2,391 children are using one of the EMH science programs. Approximately thirty-one kits, or $23,250 worth of materials, were purchased immediately by twenty-one districts, with several times that amount in the offing.

Seventy-seven percent of the participants believed that because of their participation in the institute, science instruction in their EMH classrooms or district is possibly allotted more time—25 percent of the participants estimated an increase of 15 percent, 35 percent estimated an increase of 30 percent, 10 percent estimated an increase of 45 percent, and 30 percent estimated an increase of 60 percent. About 40 percent felt this increase in time spent in science instruction occurred because they had attended the institute, whereas only 3.5 percent believed this increase would have occurred whether or not they had attended the institute.

Only 4 percent of the participants felt they had influenced no administrators to investigate one of the EMH science programs, 31 percent felt as if they had influenced one or two administrators, 39 percent believed they had influenced three to five administrators, 19 percent believed they had influenced six to nine, and 7 percent believed they had influenced more than ten administrators to investigate one of the programs.

Concerning the public presentations that the participants gave, 87 percent indicated they enjoyed the experience and found it rewarding, while 13 percent moderately enjoyed the experience. Seventy-six percent of the participants felt they were very well prepared for the presentation, whereas the remaining 24 percent felt adequately prepared. None felt inadequately prepared. Sixty percent believed that the interest of people at the presentation was very high, 24 percent indicated the interest was high, and only 16 percent indicated the interest was moderate. Fifty-seven percent indicated they had an excellent selection of materials for display and for hands-on activities, 35 percent indicated they had an adequate selection of materials, and 8 percent indicated that they lacked some important materials.

Table 4. Responses by Participants to the Questionnaires.



Responses to another section of the questionnaire are shown in Table 4.

The following are examples of responses to other items on the questionnaires. All are of a positive nature, for there were no negative comments returned.

A. Some of the activities or teaching strategies learned during the institute that I have found most helpful to me are:

The general approach reinforced many ways to teach awareness. The emphasis was on concrete experiences, which are the most effective ways special ed. children can learn. The basic, simple methodology is carefully explained so that any teacher can follow.

The idea of accepting all answers and building on them was helpful. I had used this technique before, but it was good to be reinforced with programs and people who felt the same way.

The use of cassette tapes to record sounds was helpful; also, the use of maps and compasses. I have found that children enjoy even the simplest experiments if they can use test tubes, beakers, etc.

What I found most helpful was working with teachers from the field of science. Science was a subject I avoided until I participated in the institute. I don't think I would have felt comfortable with the BSCS materials if I hadn't attended the institute.

Like many special educators, I had little or no prior practical science experience. The opportunity to engage in "hands-on" experimentation was extremely useful.

Science as discovery—it surprised me the children caught on to some of the terminology; they understood it and were able to use it.

B. My comments concerning the EMH Landmarks are:

I have thoroughly enjoyed the information on conferences and the brief notes explaining current laws and federal guidelines. Of course, the "newsy" notes about other participants are most informative. I eagerly anticipate the arrival of EMH Landmarks.

Newsy! Also informs me of other happenings in the science field and how science educators relate to the field of special education. Increased my interest in science journals!

Very informative!

Love it! Scholarly? It's not meant to be. Folksy? Yes, it is that...reminds me of my hometown newspaper (circulation, 65). How about adding some want ads? Seriously, it's reinforcing to those who are actively promoting the product. Conversely, it fosters guilt in those who aren't. Let's keep it.

Excellent! Keep it up. Include more supplemental articles and sources for research articles in the field.

Participants learn about the digestive tract, using the model of the human torso from ME NOW that they called "Dudley."

C. What do you feel was the most valuable part of the institute to you in your teaching?

The people who participated. Their interests and concerns.

The simulation of classroom setting and role playing in teaching the activities. The "hands-on" experiences.

Seeing the value of science for EMH children.

The most valuable part of the institute was the "hands-on" approach. This approach, coupled with the learning principles presented, made me more competent and secure in presentations and in the classroom. And, finally, the actual existence of such a good quality science program increased positive feeling toward the teaching of science to the EMH.

Working directly with science teachers and watching their attitude concerning EMH students gradually change from negative to positive.

The institute has made me slow down and teach things more thoroughly, not only to my EMH students but to other classes also. When I saw how much more effective were the lessons that we taught each other when the person followed the teacher's guide closely, I started doing that not only with EMH materials, but with the Patterns and Processes *discussion guides also.*

To awaken in me an awareness of the needs of this special group of students and a desire to contribute to the fulfillment of their needs. Participation in this institute has made me consider as a future direction for my professional career the educating of teachers in science methods. Particularly, to teach those students with special problems. I have started to take courses and to do research along these lines, so I may take this direction in the future.

What I picked up from the creative and talented people I associated with. The classroom activities that we did ourselves or that we watched. The functionality of the institute—the down to earth activities.

D. What do you feel could have been done to make the institute more helpful to you now that you have had an opportunity to use some of the materials in your own classrooms or for inservice presentations?

I felt well prepared as far as the materials were concerned. My science background was shaky since I have had very little course work in this area.

I really feel it was adequately done. Perhaps more time to explore the opposite level would have been helpful for many.

Making an additional list of activities/suggestions to supplement the book.

E. Would you suggest to one of your friends that he or she attend this type of institute? Explain your response.

Yes...Being in a setting away from the usual responsibilities allows one to concentrate completely, thus become enthusiastic and totally committed to its purpose. It allows enough time for problem solving and exchange of viewpoints.

Most definitely! What it did to improve my attitude and interest in science is quite obvious to my fellow teachers, and my enthusiasm for my program has been shared with them. They're quite interested in Dudley and my experiments, and often ask what I'm working on—so do the students in our building.

I would encourage anyone who had the opportunity to attend the institute to do so, especially special educators. Most university curricula don't offer courses in the teaching of science to the mentally handicapped. Most likely, few special educators with no or little experience with science would consider purchasing a kit such as ME NOW. The institute opens doors to an area of importance which has been closed for some time.

Definitely! It fostered professional growth because I think everyone left with much more to offer their students, especially the special ed. teachers, because science is an element sadly lacking in their (my) course background. Because of this, they feel unable to teach science adequately to their classes, and the deficiency is passed on. The institute not only presented a curriculum to teach, but took us through ways of teaching it.

F. List any suggestions for ways that you feel we could continue to help you.

How about continuing to keep us updated on new developments, continuing to validate test results on gains made by students, collect techniques or hints to make lessons more effective, easier, etc.

I would like to have been put in contact with people who were interested in the program from this area. I presented the program to members of my school district. They thought very highly of it, but are slow to change over to new programs.

None that I can think of, for you have been helpful in obtaining movies and videotapes for my presentations. I feel very free in asking for your support and will not hesitate to ask in the future.

Continue to visit us.

Perhaps it would be helpful to spend more time solving such problems as how to approach "resistant" administrators; where to obtain dollars to purchase the materials, funding sources, writing mini-grants, etc; how to gain support from science teachers who've been deeply entrenched in traditional curricula. In other words, although the institute changed attitudes of the participants in a positive direction, the participants could benefit from some "strategies" for doing the same back in their respective communities.

Teams of Participants Attending the Follow-up Workshop

The team from Norfolk, Virginia, was comprised of Jesse Allen, Rebecca Brown, Cynthia Edwards, Grace Setzer, and Ernestine Swain.

Wanda Kojima, Miles Muraoka, Carole Hastings and Nick Nichols are planning an extensive implementation program in Hawaii.

The team members from Council Bluffs, Iowa, who attended the workshop were Kenneth Gilreath, Harold Smith, Jan Peterson, Wilda Briggs, and Myra Mass.

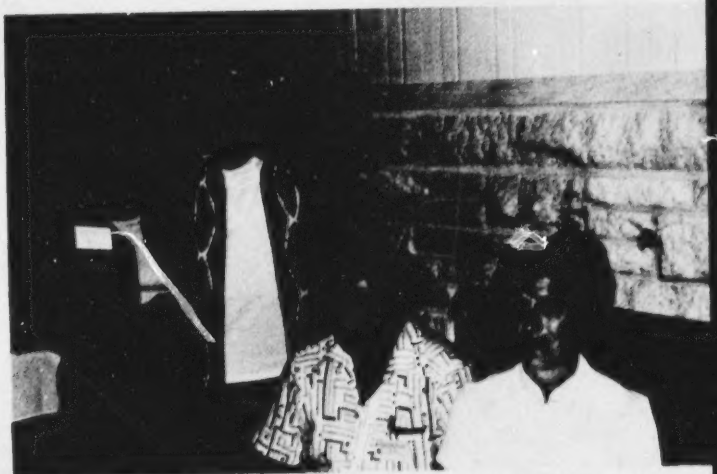
The newly organized team from Oshkosh, Wisconsin, included Mary Spanbauer, Grant Rehder, Pat Koeneman, Susan Teas, and Eugene Russo.

Members of the team from Baltimore, Maryland, were Gene Swain, Don Clanton, Arthur George, Constance Tate, Juanita Addison, and Leoner Pye.

From southern Maryland came the team which included Dave Williams, Jim Turner, Bob Pender, Jo Pender, and Charlotte Welker.

Janet Collier, Frances Stewart, Delores McGhee, Yvette Castillo, and Helen Hunter formed the team from Atlanta, Georgia.

Charles Cordova, Carol Avalos, Leslie Dodge, Sel Elizondo, and Candy Light comprised the implementation team from Pueblo, Colorado.



Members of the newly organized team from Greeley, Colorado, who attended the workshop were Norma Boekel, Vicki Heisler, Larry Irwin, and Mary Palmquist.

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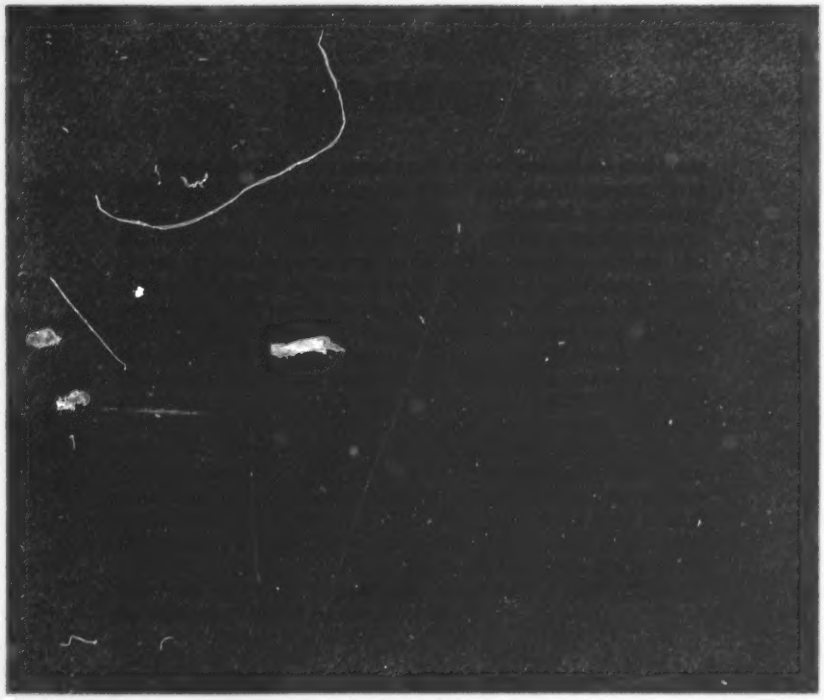

Participants Sel Elizondo and Yvette Castillo learn to use metric measurements.